Chapter 5 Supplemental Material

User Cost of Home Ownership

User Cost of Capital

- Relates benefits of owning property to the ‘costs’ of owning property
- Accounts for the effects of taxes, inflation, and maintenance on prices
  - For home owners, the user cost is the per-period cost associated with a ‘unit’ of housing capital (C).
  - For renters, the user cost is the rent (R).
- User Cost of Capital Theory:
  - Assume that a homeowner ‘rents’ his/her unit to themselves at price R.
  - The homeowner is interested in maximizing profits given costs, C.
  - Landlord chooses rent R such that they:
    \[
    \text{max profit} = R - C
    \]
- Assume the housing market is competitive (excess profits are equal to zero).
  - In equilibrium, \( R = C \).
    - C already includes a fair return to capital and labor
    - If not, one form of obtaining housing services dominates the other
User Cost of Capital

- Define $P$ as the price of the housing unit.
- What are the costs of purchasing that unit of housing?
  - Opportunity cost of funds used to purchase housing.
    - If you equity finance the home, your opportunity cost of funds is the foregone interest rate you could have earned.
    - If you debt finance the home, your opportunity cost of funds is the interest rate on the loan you must pay.
  - We will assume that lending rate = borrowing rate = $r$ (real return).
  - The nominal rate of return is $r + \pi_e$, where $\pi_e$ is the expected inflation rate.

- Let’s assume complete debt financing (for discussion purpose)
  - Major cost of owning home is the mortgage cost.
- Assume an interest only loan
- Capital cost of owning any property = $r * P$

Other Costs of Owning ANY Property

- Must maintain the property.
  - Let’s call $m$ the per dollar maintenance cost.
  - Cost due to maintenance = $m * P$
- Depreciation cost (given the home is a structure, some of the structure deteriorates over time).
  - Let’s call $d$ the per dollar depreciation cost.
  - Cost due to depreciation = $d * P$
- Must pay property taxes
  - Let’s call $t$ the property tax rate.
  - Cost due to property taxes = $t * P$
- Housing is riskier than investing in a t-bill. You bear the cost of the risk.
  - Let’s call $\alpha$ the per dollar risk premium you bear for holding real estate (as opposed to t-bill)
  - Cost due to additional risk = $\alpha * P$
A Benefit of Owning Residential Property

- For homeowners who occupy their property, they get to:
  - Deduct nominal interest payments from their income taxes.
  - Deduct property taxes from their income taxes
    - Some time might not qualify for the full deduction due to AMT
- Let's define:
  - \( \theta \) as the income tax rate.
- Get to deduct:
  - \( (r + \pi^e) \times P \) (nominal interest payment)
  - \( t \times P \) (property taxes)
- Saving that occurs from tax deductions: \( \theta(t + r + \pi^e) \times P \)

A Benefits of Owning Residential Property

- Get to keep the capital gain (if it occurs).
- Define \( g \) as the real rate of expected property appreciation.
  - Benefit from owning property due to price appreciation = \( g \times P \)

- User Cost for Residential Property
  
  \[ C = [(r + d + m + t + a - g - \theta(t + r + \pi^e))] \times P = \mu \text{ (residential)} \times P \]
  or
  \[ C = [(1- \theta)(r + t) + d + m + a - g - \theta \pi^e] \times P = \mu \text{ (residential)} \times P \]
Interpreting the User Cost Theory

- \( R = \mu \cdot P \) (general user cost formula)
- Rewrite: \( \frac{R}{\mu} = P \)
- In essence, \( \mu \) is a discount rate. If we observe the ‘implied’ rent and we know the implied discount rate, we should know the value of the property.
- User cost implies a direct link between rental prices (flows) and property prices (rents and house prices are linked in equilibrium!)
- The discount rate (user cost) is a function of real interest rates, tax rates, market risk, expected future capital gains on the property, depreciation rates and tax rates.
- Additionally, residential user costs are affected by expected inflation and personal income tax rates.

Summarizing User Cost Effects

- \( R = C = [(1- \theta) (r + t) + d + m + \alpha - g - \theta \pi^e] \cdot P = \mu \) (residential) \( \cdot P \)
- Increases in real interest rates will increase user cost of owning housing.
- Increases in property tax rates will increase user cost of owning housing.
- Increases in maintenance costs will increase user cost of owning housing.
- Increases in risk premium for housing will increase user cost of owning housing.
- Increases in income taxes will decrease user cost of owning housing.
- Increases in expected inflation (for a given real rate) will raise nominal rates and will decrease user cost of housing.
Summarizing User Cost Effects

• Shortcomings:
  – Static / one-period model
    • Ignores selling costs
    • Model extension to include expected tenure and per period selling cost
  – Opportunity cost of capital likely to vary from person to person
  – Risk premium hard to quantify
  – Ignores mortgage options
    • Default; prepayment
  – Tax deductibility changes as mortgage is paid down